On Their Own: Students' Academic Use of the Commercialized Web

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Abstract

This article reviews research conducted in 1998–99 examining students' perceptions and uses of the World Wide Web for academic purposes. Recent developments in the Web that may be of particular interest to educators and parents of students are considered.

Since the mid-1990s the Internet, and more specifically the World Wide Web, has been eagerly adopted by school districts, administrators, teachers, parents, and students. Recent data from the National Center for Educational Statistics indicates that, in the fall of 2002, 99 percent of public schools and 92 percent of instructional classrooms were wired for Internet access (Kleiner, Lewis, & Greene, 2003). This is even more impressive when you compare 1994 figures, which estimated that 35 percent of schools and 3 percent of classrooms had Internet access. The latest in a long line of technological solutions to our educational woes, the Web, and its evangelists, promise no less than a radical restructuring of the way that students access and acquire information. However, some have raised concerns about the value of the Web as an educational resource. Historians have noted that the use of the Web in a public school setting marks the first time that the end user controls the process of choosing the content to be consumed.

To this end, critics have pointed to the incredible range of content accessible via the Web and its potential for distracting students from the task at hand. Hecht (1997) argued that "having the Internet in the classroom is like equipping each classroom with a television that can be turned on at any time and tuned in to any of 100,000 unrestricted channels, only a tiny

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fraction of which are dedicated to educational programming (and even those have commercials)" (p. 15). McNealy (1999) voiced a similar concern when he wrote, "Right now, putting students in front of Internet terminals is no better than putting them in front of TV sets. It may even be worse" (p. 17A).

Public education's adoption of the Web as a tool for research and as an alternative to traditional resources raises several issues related to the notion of functional equivalence. First, the wide range of content available via the Web allows it to serve numerous "functions" for students. Second, time spent using the Web in school is time not spent in activities that are displaced by Web use. And finally, the value of the Web for academic research is contingent on the quality of the research material contained therein (Bennett, Wilkinson, & Oliver, 1996). Educators' concern about the unevenness of the quality of information available via the Web is obvious when one reviews the many Web sites devoted to critical thinking skills and Web site evaluation tutorials. The question remains for public schools and the whole of society: With the stakes so high, how can we harness this unwieldy resource so that it serves our educational goals and purposes?

Earlier Research

Research conducted in 1998–99 in ten public schools in a Western state found that students believe the Web to be a valuable resource for educational activities; the study also found, however, that students are often unsuccessful in finding appropriate or useful resources on their own (Ebersole, 1999). Approaching the research from a mass communication perspective, this study applied uses and gratifications theory to the questions surrounding students' attitudes and opinions about the Web: what purpose it served for them, how they used it, and whether these were related. The study combined quantitative and qualitative research methodologies and several data-gathering approaches with a sample of middle and high school students drawn from ten public schools.

A paper survey was administered first to approximately 800 students. The survey contained 75 items designed to measure students' (1) affinity for the Web, (2) assessment of the value of the Web for various purposes, (3) skill level for computer and Web use, and (4) uses of, and/or reasons for not using, the Web. The 40 use statements in the survey were generated by students' anonymous responses to an open-ended question asking them to list several things "that the Web is good for." These statements, as well as others generated during a pilot study, were presented as 5–item Likert scales that attempted to measure students' use of the Web at school.

Second, a computer-administered survey requested responses from students as they began to access the Web from the schools' media centers. This brief instrument asked only four questions: grade level in school, gender, how much the student uses the Web during an average week, and the

student's purpose for using the Web at this particular time. For the fourth question, the choices presented to the student were factors identified by Principle Components Analysis of the use statements from the paper survey. The seven uses for the Web as presented in the computer-administered survey were "for research and learning," "to communicate with other people," "for access to material otherwise unavailable," "to find something fun or exciting," "for something to do when I'm bored," "for sports and game information," and "for shopping and consumer information." As an option to the seven use statements presented, the student could select "other" and use a text box to enter a use that better described his or her purpose for using the Web at that particular time. The phrasing of the question, "What is your purpose for using the Web at this time?" was designed to measure gratifications sought and the "behavioral intention" (Palmgreen & Rayburn, 1982) of the student.

The final step in the data collection process was to gather a sample of Web site addresses (URLs) accessed from the media centers' computers during the survey period. Approximately 123,000 URLs were collected from the computers on which the surveys were installed. The URLs were examined to determine the number of Web sites from the five generic TLDs (Top Level Domains). Also, a random sample of the 123,000 URLs was drawn and selected sites were reviewed and coded by two educators who had been invited to participate in the study. The coders—media specialists employed by a local school district—were asked to visit and explore a Web-based tutorial designed to train users to evaluate Web sites in order to determine their suitability for use as research sources for middle and high school students (Schinker, 1997). Some of the categories used for evaluation were Web address, content, credibility of the author, revision date, and links. A meeting was held with each of the coders to discuss criteria to be applied to the Web sites and to answer questions about the coding process. Once intercoder reliability was established at an adequate level (alpha = .92) the coders reviewed the 500 randomly selected sites and assigned a use category. Next, they rated each site based upon its perceived value as an educational resource.

Results and Discussion

The results of the two surveys and the content analysis of sites visited by students suggest that students believe the Web to be an important and valuable educational resource, but they are not consistently successful at finding appropriate and educationally valuable sites. Respondents to the computer-administered survey gave the following reasons for using the Web: "for research and learning" (n = 541, 52 percent); "to communicate with other people" (n = 74, 7 percent); "for access to material otherwise unavailable" (n = 55, 5 percent); "to find something fun or exciting" (n = 85, 8 percent); "for something to do when I'm bored" (n = 56, 5 percent); "for sports and game information" (n = 65, 6 percent); and "for shopping

and consumer information" ($n = 10$, 1 percent). In addition, 165 students (16 percent) chose not to select from the seven options presented. Of these, 94 students elected to write in a response to this question. The write-in responses offered by students to explain their purpose for using the Web were grouped into categories as follows: specific research topics ($n = 20$), sexually explicit material ($n = 20$), games and amusements ($n = 14$), general research and learning ($n = 11$), combinations of things ($n = 10$), communication ($n = 5$), and other unclassified ($n = 14$). However, an analysis of Web sites visited by students revealed a different story. First, an analysis of the most frequently visited TLDs was conducted. Of the total URLs collected, 77 percent ($n = 94,426$) were from the .com domain; 5 percent ($n = 6,289$) were from .net; 5 percent ($n = 5,704$) were from .org; 4 percent ($n = 4,842$) were from .edu; 1 percent ($n = 1,640$) were from .gov; 1 percent ($n = 1,403$) were from .us; and 7 percent ($n = 8,767$) were from other or unidentified domain names. These numbers stood in contrast to the distribution of domain names that made up the state of the Web at that time. According to a survey of Web domain names by host count conducted by Network Wizards at the time of the study, the actual make up of the Web was not as heavily skewed toward the commercial domain sites as the student sample would suggest.

The reason this is significant is that when educational media experts ranked a sample of 500 Web sites for "suitability for academic research," commercial sites received the lowest mean score (1.59 on a scale of 1 to 3, with 1 = not suitable, 2 = questionable, and 3 = suitable). Similarly, Web pages from the .gov (3.0), .org (2.78), and .edu (2.44) domain names were rated more favorably by coders but visited much less frequently by students.

Another area where students' survey responses seemed at odds with the data collected from actual sites visited is the "intended use" or "purpose" for using the Web. As stated earlier, students were asked, "What is your

Table 1. Top Domain Names by Host Count, Internet Systems Consortium, January 1999 and January 2004

	1999		2004	
Domain Name	Number of sites	% of total	Number of sites	% of total
com (commercial)	12,140,747	41.9	48,688,919	30.3
net (network)	8,856,687	30.6	100,751,276	62.7
edu (education)	5,022,815	17.3	7,576,992	4.7
us (United States)	1,562,391	5.4	1,757,664	1.1
org (organization)	744,285	2.6	1,332,978	0.8
gov (government)	651,200	2.2	676,595	0.4
Total	28,978,125	100.0	160,784,424	100.0

Source: Internet Systems Consortium, 2004.

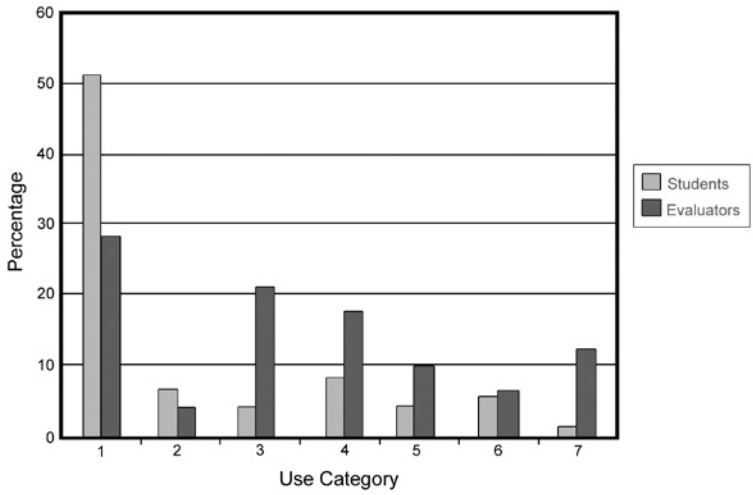
Table 2. Mean Suitability for Academic Research of Sites by Leading Domain Name

Domain	(N)	Mean Suitability for Academic Research as Assigned by Coders
.com	(410)	1.59
.org	(25)	2.78
.edu	(16)	2.44
.net	(12)	1.75
.gov	(9)	3.0
.us	(5)	2.0
other	(23)	1.94

Note: 1 = not suitable, 2 = questionable, 3 = suitable
Source: Ebersole, 2000.

purpose for using the Web at this time?" as they logged into the Web from their schools' media center computers. Later, educational media experts were asked to assign the same categories to a sample of 500 sites visited by students. The disparity between self-reported uses of the Web and evaluators' assessments of sites visited is indicated by Figure 1.

Figure 1. Student Self-Reported Use Compared to Use as Assigned by Media Experts



Note: Use categories are as follows: 1 = research and learning, 2 = to communicate with other people, 3 = for access to material otherwise unavailable, 4 = to find something fun or exciting, 5 = for something to do when I'm bored, 6 = for sports and game information, 7 = for shopping and consumer information.

The disparity between students' self-reported uses of the Web and evaluators' assessments of sites visited invites several possible explanations. First, students and educational media experts would be expected to apply different standards and criteria when evaluating the same Web site. In other words, if a group of students had been asked to apply the same use standards to the same 500 sites evaluated by the experts, we would expect there to be significant differences. Also, there are expectations for Web use, often outlined in schools' Acceptable Use Policy statements, that undoubtedly affect students' responses, even when anonymity is provided to survey respondents. Students were likely to respond to this question with an answer that they believe to be appropriate when using the Web at school—namely, academic research. However, there may be an equally valid explanation. It could be that students' initial intentions were sidetracked by several factors, for example, distractions created by "entertaining" Web sites available at the click of a button, failure to readily distinguish between scholarly and commercial content, failure to find relevant material because of poor search strategies, or search engine results that direct users to less appropriate Web sites (as defined by academic research goals). In the following section of this article I will explore ongoing developments in the structure and character of the Web that may be contributing to these impediments to effective use of the Web in a public school setting.

Recent Developments

Since its inception, the Web has shown a remarkable pattern of growth, both in raw size and in terms of becoming an increasingly commercial enterprise. The first issue—the Web's size and diversity—is generally perceived to be one of its greatest attributes. For those looking for information, however, clutter is a very real problem. As Shenk (1997) observed, too much information, what he calls "Data Smog," can be, literally, too much of a good thing. Recent estimates put the number of Web pages at well over 6 billion, up from approximately 2 billion in 2000. And more importantly, the growth appears to be greatest in the commercial sector. Dot net and dot com Web sites now account for over 90 percent of all sites as measured by TLD host count (Internet Systems Consortium, 2004). And as you may recall from the research reported earlier, Web sites from these domains received the lowest ratings for "suitability for academic research." Finding Web sites appropriate for the academic enrichment of this target audience can be like finding the proverbial needle in a haystack. In this case the haystack contains many needles, but the size of the haystack is enormous and the needles are remarkably similar in size, color, and texture to the stalks of hay. Or to use another metaphor, even when you are really thirsty, it is easier to sip from a straw than to try to drink from a fire hose.

In this environment of an overabundance of data, the hunt for usable information usually begins with a search engine. Research suggests

that Web users often start with a search engine when looking for specific information, and in a recent survey 56.3 percent of respondents said that they used a search engine at least once a day (iProspect, 2004). As others have already suggested, this reliance on search engines may be instilling a false sense of security, or at least an undeserved confidence, in the search results' accuracy, relevance, and completeness.

Although it is not evident to the casual surfer, the Web search industry has been contracting in recent years, largely because of mergers and acquisitions. At present three companies dominate the search engine provider market. Google, Teoma, and Yahoo!, which recently absorbed AltaVista, Inktomi, and AlltheWeb, provide the algorithms that return search results on most of the major search portals. For example, the new search portal from Amazon (www.A9.com) is powered by Google; AskJeeves is powered by Teoma. So while there may be an appearance of many options and search engines from which to choose, it is, in fact, a mirage.

But it is the practice of combining algorithmic searches with those from commercial search databases that gives even greater cause for concern. With the notable exception of Google, search portals frequently display results without clear indicators to differentiate the paid results from the unpaid. This practice has resulted in a financial boon for search portals that previously had been unable to capitalize on their success at attracting consumers' attention. However, for the academic surfer the practice compromises the integrity of the search while, at the same time, biasing the results toward commercial enterprise.

It is not just "pay for listing" or "pay for positioning" schemes that raise questions, however. Critics have suggested that current search engine policies and practices call into question the veracity of their results. For example, in this volume Walker (see also Walker 2002) argues that links to and from Web pages are interpreted by search engine algorithms, which in turn determine search result relevance, and this relevance translates into power that controls access to information. While the search engine providers do their best to prevent disclosure of their search algorithms, countless search engine marketing businesses have sprung up providing the latest "cheats" designed to manipulate the results to favor their clients.

Even without overt manipulation of search results, search engines may be delivering results that reflect inherent biases. According to Introna and Nissenbaum (2000), search engine results "give prominence to popular, wealthy, and powerful sites at the expense of others" (p. 181). They go on to argue that commercial search engines cannot be expected to correct these injustices but rather an alternative must be devised to ensure that the Web is able to exist as a "public good." This notion of a public good implies that the Web ought to serve the interests of all members of society and all manner of Web content creation and dissemination, not just those that are commercially viable. In this case, alternatives to commercial search

engines ought to be provided to students who use the Web for academic pursuits.

Despite its origin in scientific research and educational pursuits, it did not take long for marketers, advertisers, and public relations practitioners to find the Internet. What they found was an uncharted land that rivaled their wildest dreams. More than a decade later the Web remains the least regulated of all mass media. Although the dot com bust of the early 2000s slowed the commercial expansion of the Web, we are beginning to witness a strong rebound in every area, including online advertising. Today, the one feature that best defines the Web is its unrelenting commercialism. For those who have a vision for the Web that extends beyond the virtual strip mall (for example, Fabos, 2004), this defining attribute must not go uncontested.

It is not just the omnipresent commercialism of the Web that raises concerns, however. The blurring of lines between fact and fiction, between opinion and news, and between credible and incredible reporting also draws into question the usefulness of the Web for young scholars. A high level of sophistication is necessary to understand the hidden economic relationships that often influence content and access to content. For example, students are routinely cautioned about personal postings by Web authors who have strong opinions but weak credentials. But how many are being told about the economic structure that makes a popular blog not only highly relevant to search engines but places targeted ads on the blog intending to reach surfers who match the desired profile? Blogger Steve Rubal (2004) refers to the intersection of public relations and participatory journalism as "Micro Persuasion"—but it may have maximum impact on the veracity of online information. Consider, too, the commercially oriented Web site that provides the equivalent of product placement advertisements. We have become relatively sophisticated and sensitized to product placement in film and television, but when it is buried in the text of an essay or opinion piece, it may be undetectable to the vast majority of unsuspecting readers. Corporate Web sites also routinely publish "white papers" that are favorable to their products and services, but they are without the benefit of objectivity and full disclosure.

Conclusion

One thing appears to be clear from this research and other studies conducted with middle and high school students—effective use of the rich resources provided via the Web is complicated by a number of intervening variables. In 1997 a study of sixth and ninth grade science students found that they were often unsuccessful in finding useful academic information. Lyons, Hoffman, Krajcik, and Soloway (1997) observed that "one overall theme is clear from the data: students need a tremendous amount of support to be successful in online inquiry." Several years later my research

confirmed that middle and high school students are frequently unsuccessful in finding appropriate information either because of poor search strategies or the distractions that abound on the Web (Ebersole, 2000). Today the problem continues as the Web expands and mutates faster than we can equip students with the skills necessary to make sense of this multifaceted resource. And all too often, students searching the Web for information on a particular topic are on their own—sifting through a huge but uneven collection of resources without the aid of editors, research librarians, or content guides.

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